

Demonstration Project for the Integrated Control of Imported Fire Ants

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National Program Leader

Army Environmental Programs

U.S. Department of Agriculture

Cooperative State Research

Education & Extension Service

New Agreement Between AEC & CSREES

- **2000 Interagency Agreement - the U.S. Army Environmental Center (AEC) & the Cooperative State Research, Education, & Extension Service (CSREES)**
- **Areas of focus - conservation, natural resources, invasive species, pest management, and environmental programs**
- **CSREES links the research, education & extension programs of the USDA with the Land Grant Universities**

New Agreement Between AEC & CSREES

- **Land-Grant institutions & other agricultural colleges – provide research, education, & extension on new methods, technologies, & products in conservation, natural resources, invasive species, and pest management**
- **130 colleges of agriculture; 59 agricultural experiment stations; 57 cooperative extension services; 63 schools of forestry**

Species on Military Operations

- Reduce long term sustainability of training lands
- Reduce carrying capacity of land
- Impact troop health or safety
- Increase compliance costs relevant to TES, clean water, cultural resources, ...
- Increase land management & restoration costs

Impact of Invasive Species on Natural & Cultural Resources

- Decrease biodiversity
- Increase soil erosion
- Alter existing water, nutrient, & natural succession cycles
- Decrease ecosystem resistance & productivity
- Impact culturally significant resources
- Affect adjacent land

Legal Authorities Related to Invasive Species

- Plant Protection Act
- Federal Noxious Weed Act
- Executive Order 13112, “Invasive Species,” 1999
- Defense Transportation Regulation, DoD 4500.9-R, Part 5, Chapter 505, January 2001

History of Fire Ant Invasion

- Introduced to US in late 1930s or early 1940s in soil for ballast or dunnage in ships - Mobile, AL
- By 1953, found in 10 surrounding states
- Quarantine started 1958 to prevent movement of soil, used soil-moving equipment, plants, etc.
- Colonies become extremely invasive - high numbers and stinging ability
- *Solenopsis invicta*; “*invicta*” = invincible
- Fire Ant = burning, fire-like sting

Scope of Fire Ant Problems

Impacts human health, agriculture, livestock, wildlife, biodiversity, utilities, recreation, tourism, transportation (roadways), environmental quality



Scope of Fire Ant Problems

- ▮ **> 315M acres in SE U.S. & Puerto Rico.**
- ▮ **Est. overall cost of the fire ant infestation across the SE-U.S. --- over a billion\$ annually.**
- ▮ **Principle areas of expansion include OK, AR, TN, TX, NC, VA**
 - ▮ **Recent AZ**
- CA, NM,**



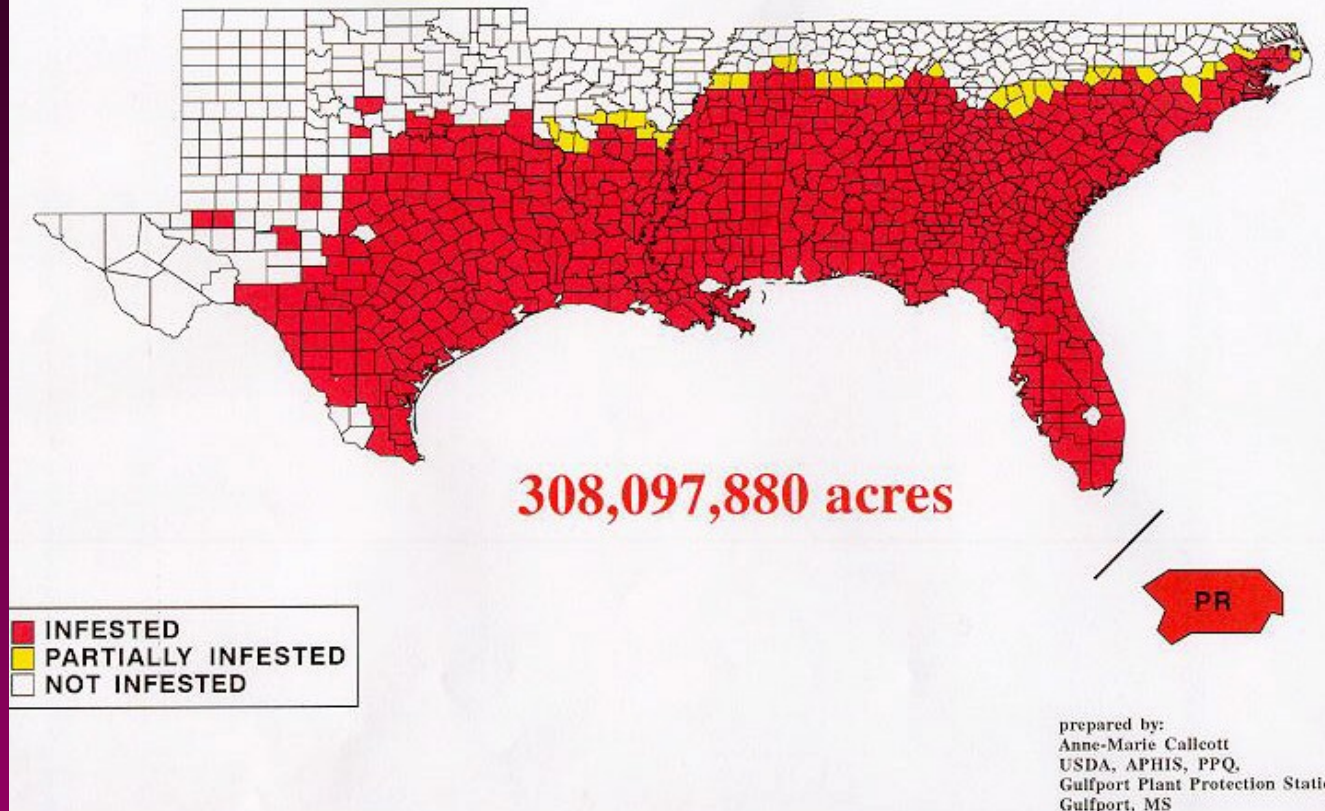


APHIS Infestation Map: 1998

IMPORTED FIRE ANT QUARANTINE - 1998

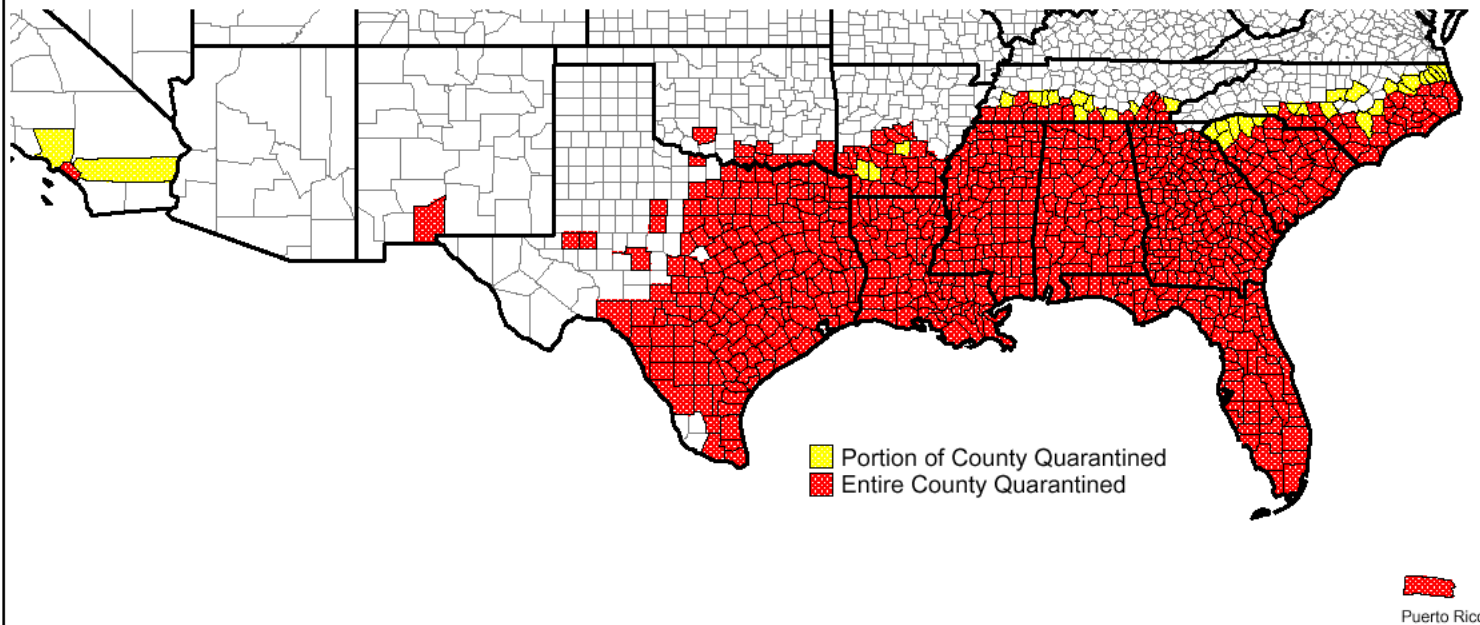
Federal Register, January 28, 1998

7 CFR Part 301.81



Status of Quarantine Map: 2000

Imported Fire Ant Quarantine

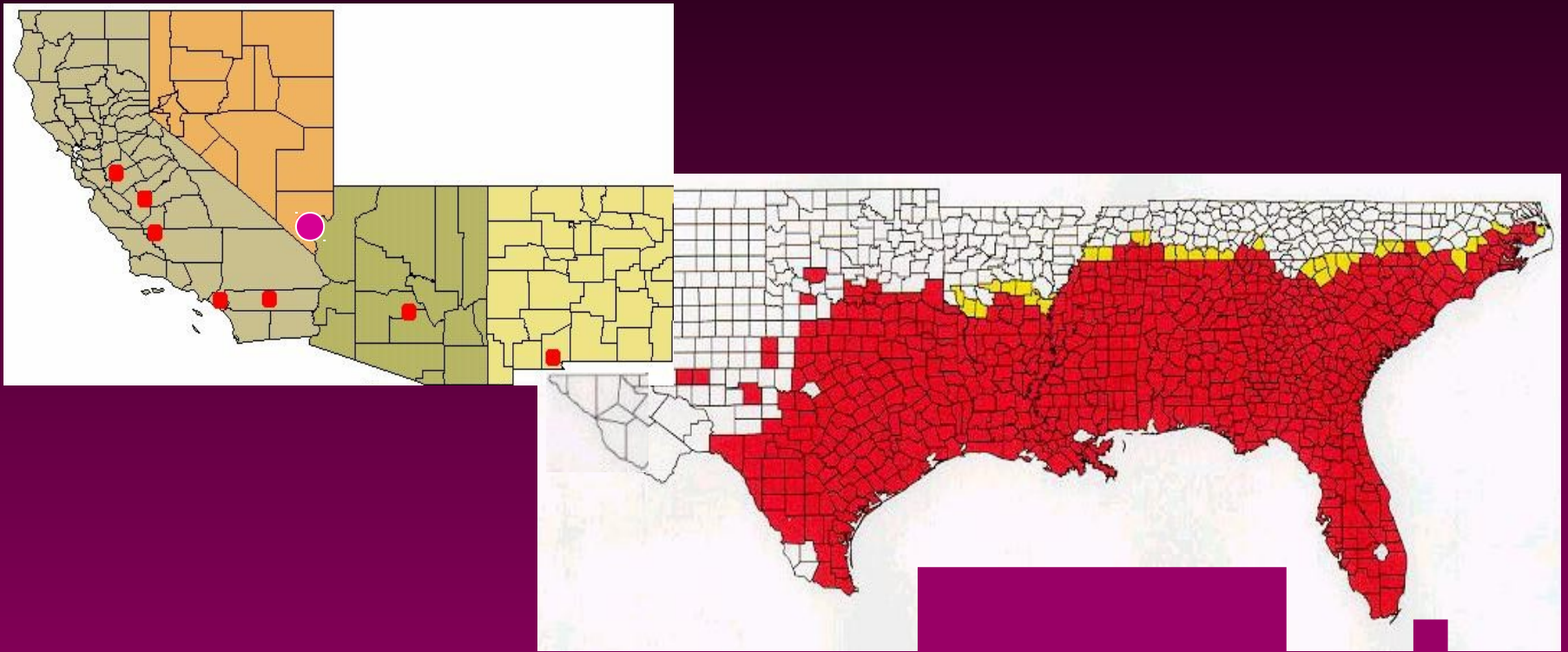


Restrictions are imposed on the movement of regulated articles from the quarantined (shaded) areas into or through the unshaded areas.

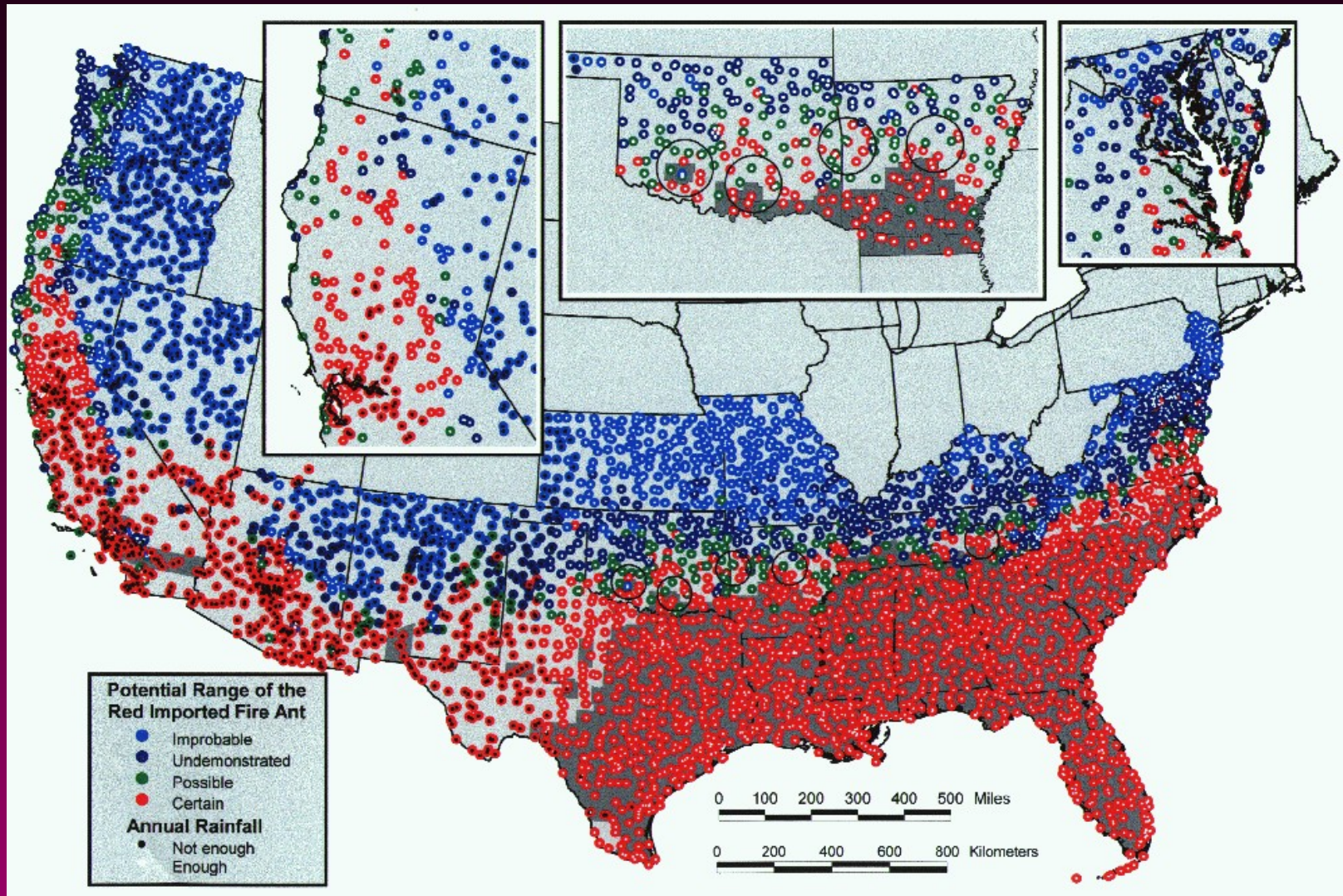
Updated November 6, 2000

Consult your State or Federal plant protection inspector or your county agent for assistance regarding exact areas under regulation and requirements for moving regulated articles. For detailed information see 7 CFR 381.81 for quarantine and regulations.

Increased Expansion of Fire Ants into California in 1998



Potential Range of Fire Ants



Why Have Past Sustained Control Efforts Failed?

Fire Ant Biological obstacles:

- Extensive infestations
- High reproductive rate
- Aggressiveness
- Baits



Pesticide obstacles:

- Treatments - expensive, time consuming, repetitive

Economic, Regulatory, & Environmental obstacles:

- Expensive to treat large areas
- Large acreage - biodiversity; sensitive environments; lakes & rivers
- Untreated areas present the problem of reinfestation

Needed: Self-sustaining biocontrol

A National Fire Ant Strategy

- **Needed:** “...coordinated effort among federal, state, and private sectors to ensure that current and new technologies are quickly evaluated for effectiveness, and rapidly implemented.”
- **Develop and optimize integrated management strategies with *biologically-based technologies* as a major component Self-sustaining biocontrol**

A National Fire Ant Strategy

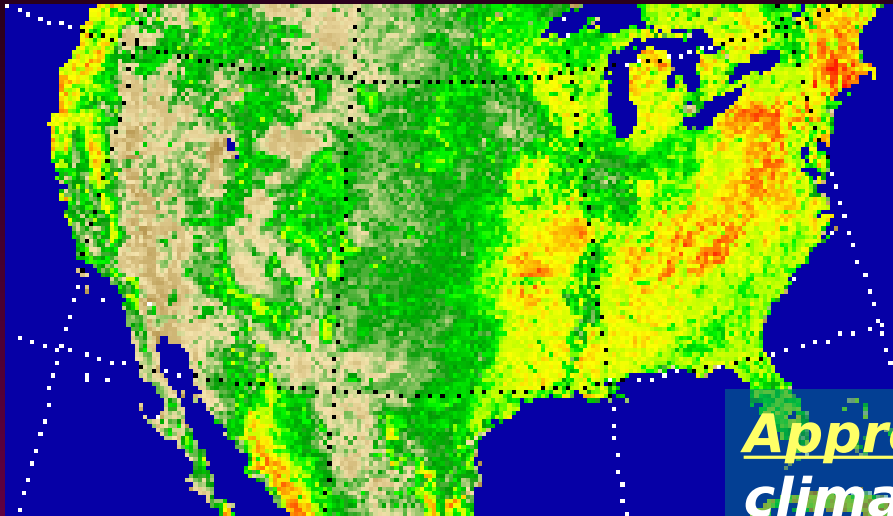
Goal

The management of the imported fire ant to levels below economic thresholds on agricultural lands [training areas], and local elimination of the imported fire ant as a nuisance or health threat in urban environments [contonment areas].

National Fire Ant Strategy

- **Release & monitor biocontrol organisms for regional comparisons; develop new biologically-based technologies**
- **Mass propagation of successful biocontrol agents**
- **Develop biologically-based IPM strategies for area-wide management of the IFA**

Customized Regional Integrated Management Strategies



Survivorship of fire ants
--- and candidate
biological control
agents --- likely are
affected by
temperature, rainfall,
soil types, etc.

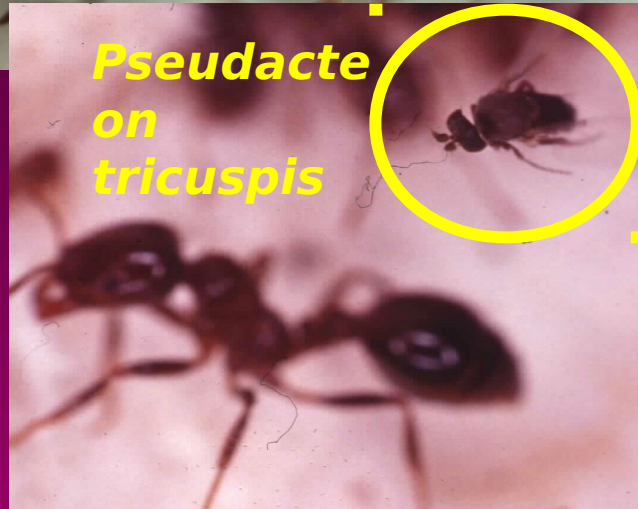
Approach: Identify
climate areas in
native range of fire
ants (South
America) where
candidate
biocontrol agents
may be found that
are acclimatized
for specific regions



Self-Sustaining Biocontrols for Fire Ants



*Solenopsis
daguerrei*



*Pseudacteon
tricuspis*



*Thelohania
solenopsae*

Phorid Flies Established at Multi-state Field Sites



Phorid fly attacking major worker of fire ant colony

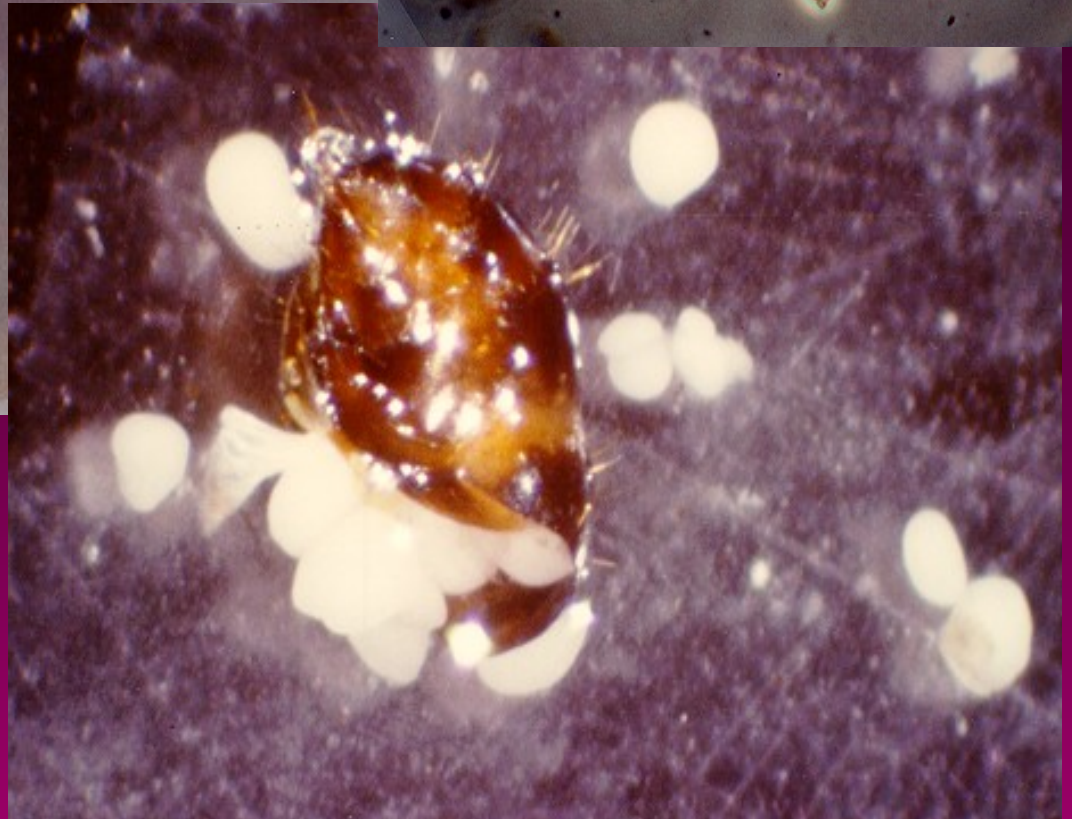
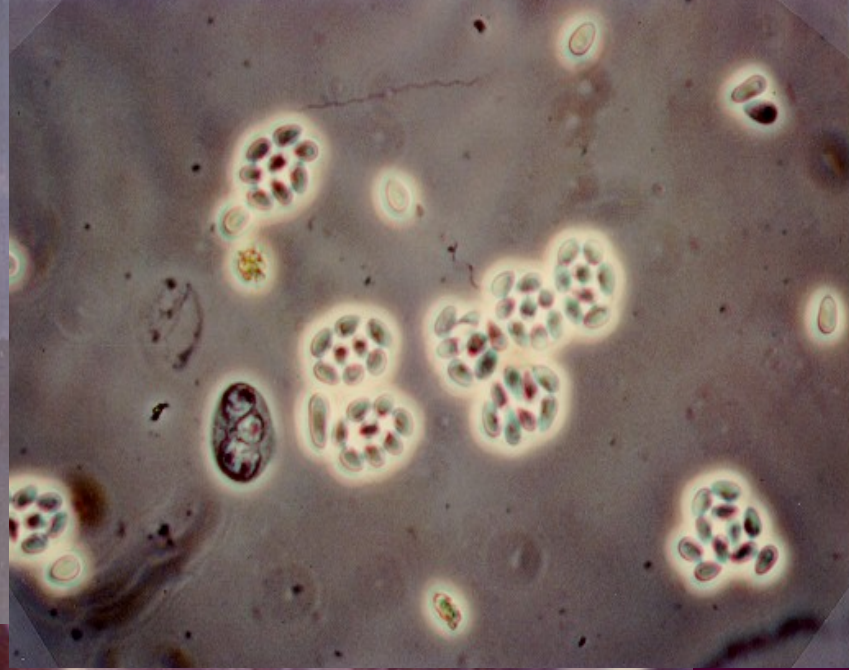


Fly emerges from decapitated fire ant --- rate of expansion is ca. 8-15 mi / yr



Phorid fly activity halts foraging

cyst



Fire Ant Integrated Pest Management Pilot Test on DoD Facility in South Carolina

Goals:

- **Integrate chemical control in “zero tolerance” area with self-sustaining biocontrol agents in surrounding areas**
- **Determine impact of biocontrol agents in reducing re-infestation capacity to result in less reliance on repeated insecticide applications.**

If successful:

This will provide a cost-effective and environmental sound strategy to reduce fire ant populations over large areas and slow re-infestation

CLEMSON
UNIVERSITY

ENTOMOLOGY
DEPARTMENT



IMPORTED FIRE ANT RESEARCH & DEMONSTRATION

Clemson University's Research/Extension Team
Cooperating with Your County Extension Office

Contact Your County
Extension Office at:

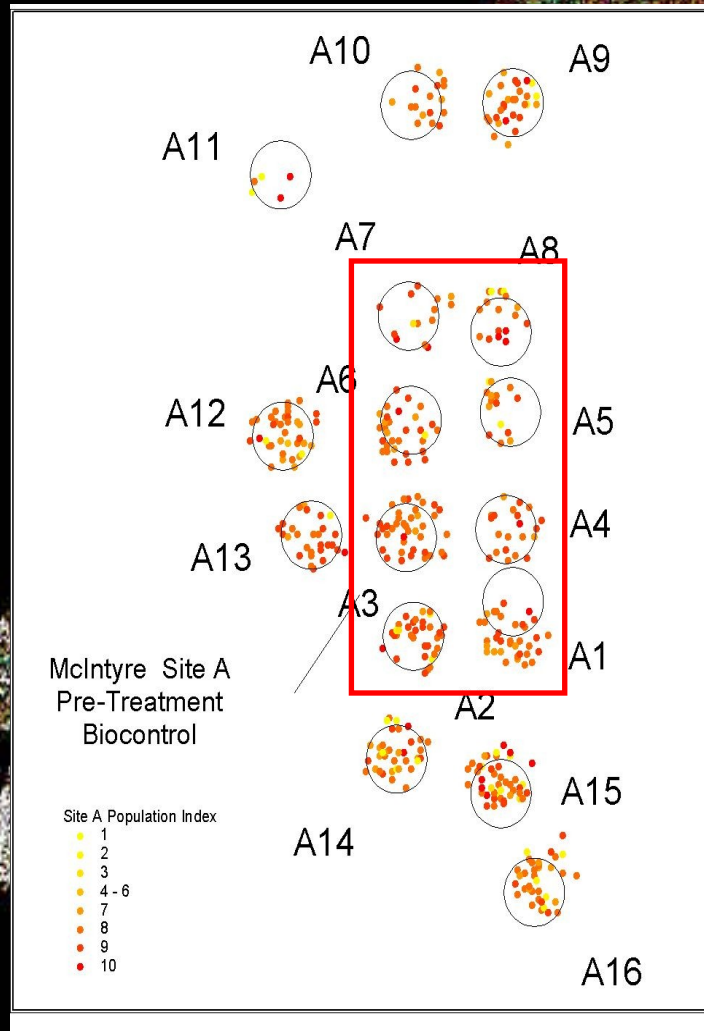
929-6030

CU Entomology
(864) 656-3113

Fire Ant Integrated Pest Management Pilot Test on DoD Facility in South Carolina

- **Objective:** Determine if an IPM strategy of chemical treatments (Fipronil) plus the addition of multiple biological control agents (phorid flies & *Thelohania solenopsae*) will reduce the number of chemical treatments needed over time to control fire ant populations.
- **Established:** June 2000

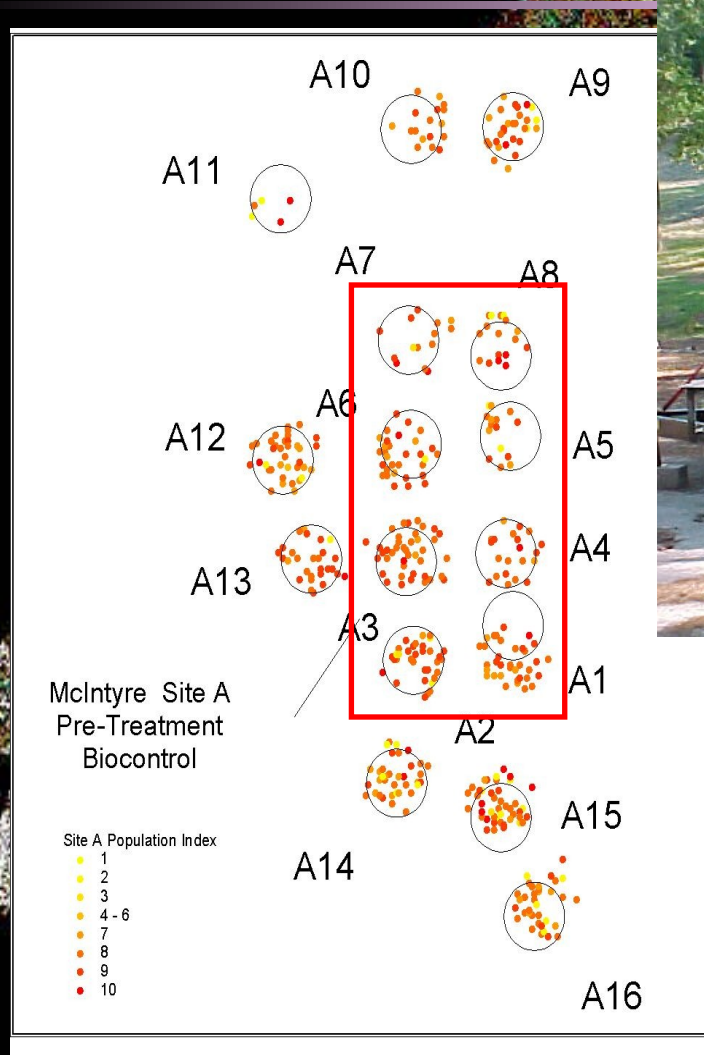
Fire Ant Integrated Pest Management Pilot Test on DoD Facility in South Carolina



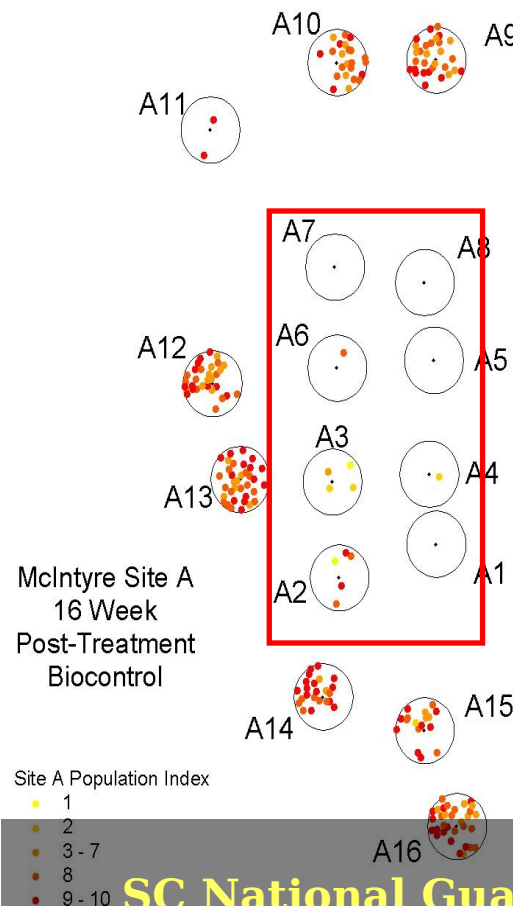
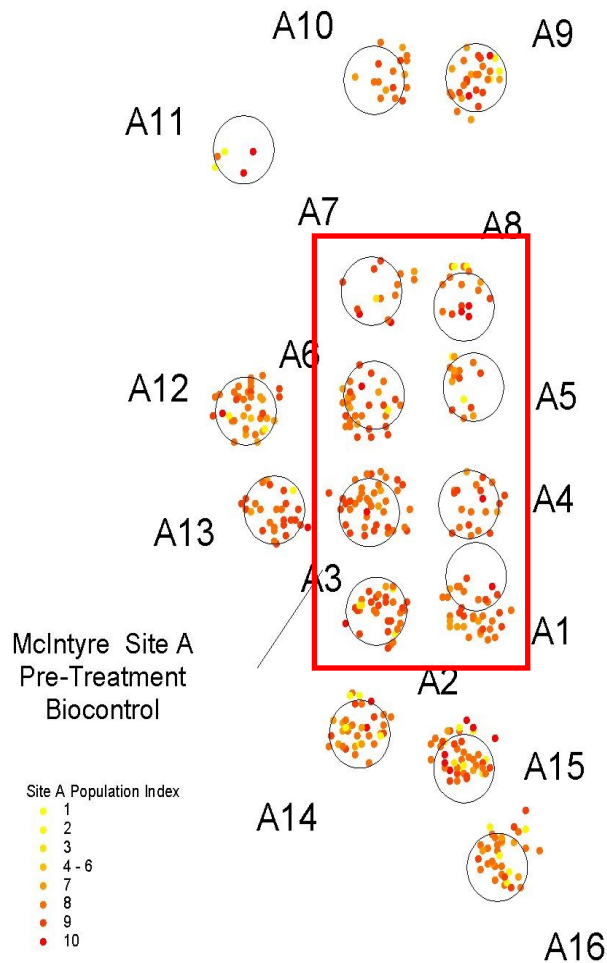
1/8 acre circular evaluation plots

Chemical treatment area-ca. 5a

Fire Ant Integrated Pest Management Pilot Test on DoD Facility in South Carolina



Fire Ant Integrated Pest Management Pilot Test on DoD Facility in South Carolina



- 96% reduction in treated area
- *Thelohania* found in adjacent colonies
- Phorid flies found at mounds near release area

Next
evaluations:
May & Sept 2001

SC National Guard, SLC, Army AEC /
CHPPM, Clemson, ARS, EPA

Demonstration Project Results

- **16 Weeks**
 - **Pesticide + biologicals** 96% reduction**
 - **Pesticide 87% reduction**
 - **Control 79% increase**
- **48 Weeks**
 - **Pesticide + biologicals** 96% reduction**
 - **Pesticide 97% reduction**
 - **Control 1% reduction**
- **66 Weeks –**
 - **Evaluation Sept 2000**
- **** Phorid flies & Thelohania present**

AREA-WIDE MANAGEMENT PROJECT

- **Proposal submitted January, 2001:**
- **An area-wide IPM strategy that utilizes self-sustaining biological control agents in conjunction with bait toxicants that will significantly reduce the need for insecticides in large-scale control of fire ants**
- **\$4.4 million over 5 years -- ARS funding**
- **Treatment sites in MS, OK, TX, and FL**
- **Size of plots 300 - 600 acres**

AREA-WIDE MANAGEMENT PROPOSAL

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New Initiative: Mass Rearing & Release of Phorid Flies

Future Directions

ARS News Service

United States
Department of
Agriculture

**Agricultural
Research
Service**

Information
Staff

5601 Sunnyside Avenue
Beltsville, Maryland
20705-5128

November 15, 2000

Jan Suszkiw, (301) 504-1630, jsuszkiw@ars.usda.gov

NEWS RELEASE:

USDA, Southern States to Release Fly Against Fire Ants

CORAL GABLES, Fla., Nov. 15--Phorid flies, parasites that decapitate imported fire ants, will be mass-reared beginning this spring for release in fire-ant-infested southern states in a new biological control initiative.

The campaign pitting fly against fire ant is part of a five-year program involving the U.S. Department of Agriculture's chief scientific research agency, the Agricultural Research Service (ARS); USDA's Animal and Plant Health Inspection Service (APHIS); and the Florida Department of Agriculture and Consumer Services (FDACS).



Enzyme released by phorid fly larva decapitated this
fire ant. (K8575-24)

New Initiative: Mass Rearing & Release of Phorid Flies



3,000 – 12,000 flies / day



1,500 flies / day



Other AEC Invasive Species Projects

- **Yellow star thistle**
- **Spotted knapweed**
- **Leafy spurge**
- **Purple loosestrife**
 - **Intend to offer interested installations assistance in establishing demonstrated biological control agents**
 - **Contact AEC if interested in this program**

Other Invasive Species Research Tracked by AEC

- **Saltcedar - USDA, ARS (Consortium)**
- **Giant reed - USDA, ARS (Consortium)**
- **Yellow star thistle -**
 - **USDA, ARS (Consortium)**
 - **University of CA; CA Dept Food & Ag**
- **Garlic mustard - Cornell University**
- **Cheatgrass - Colorado State University**
- **Kudzu - USDA, ARS**
- **Phragmites - Cornell University**

For More Information

- **Herb Bolton, Army Environmental Center**
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 - **Herb.Bolton@aec.apgea.army.mil**
- **Steve Bennett, Army Environmental Center**
 - **(410) 436-1565**
 - **Steven.Bennett@aec.apgea.army.mil**

Acknowledgements

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- **Dr. Dave Williams, USDA, ARS**
- **Dr. Mac Horton, Clemson University**
- **Mr. Glenn Williams, EPA, BPPD**
- **Fort Jackson**
- **McEntire Air National Guard Base**
- **U.S. Army CHPPM**
- **S.C. Army National Guard**
- **AFPMB**